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22 August 1969

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MEMORANDUM FOR: Executive Director, National Photographic Interpretation Center

THROUGH : Chief, Technical Services & Support Group, NPIC

25X1 SUBJECT : [REDACTED] Advanced Stereo Rhomboid/[REDACTED] 1540 Light Table Vibration Consideration 25X1

25X1 1. This memorandum describes the efforts that are presently underway to minimize the vibration problems associated with the use of the Advanced Stereo Rhomboids (ASR) and it describes other germane investigations presently underway. The deficiencies caused by excess vibration in past equipment has made TSSG quite cognizant of these problems during the development of the ASR/[REDACTED] 1540 Light Table System. In all of the light table microstereoscope combinations developed in the past, there has been some degree of vibration especially at high magnification because as the magnification is increased the effects of vibration become more and more evident. One of the most recent difficulties was centered around the 25X1 [REDACTED] Stereoscope, which has long cantilevered rhomboids and a maximum magnification of 120X. The specific steps that were taken in the ASR/1540 to minimize the previously experienced difficulties were the following:

- a. The weight of the ASR was reduced from that of the [REDACTED] Stereoscope. 25X1
- b. The majority of the weight was concentrated along the center-line of the Zoom 240, to which the ASR mounts.
- c. Every design consideration was given to maintaining the cantilever of the Rhomboid's Arm to a minimum, yet still covering the stereo pairs across the two webs [REDACTED] imagery. 25X1
- d. Features such as optical objective switching were eliminated from the design to reduce the weight and complexity.
- e. The specifications for the 1540 Light Tables includes a requirement for accommodating the [REDACTED] Stereoscope without vibration induced by the light table. 25X1

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2. From the time of the initiation of the ASR development, it was realized that vibration was a potential problem and extensive efforts have been employed to eliminate them from within the Rhomboids. The ASR is presently designed and has been tested to indicate that vibration should not be significant within the instrument. In other words, it does not produce internal vibrations itself because, when the instrument was hard mounted on a granite table, it did not transmit building vibrations. This indicates that if a vibration problem occurs, it is vibrations transmitted from the floor through the light table to the microscope. The 1540 Light Table can presently be used with existing lower power microstereoscopes in a very satisfactory manner. Likewise, using the ASR at these low magnification ranges will present no vibration difficulties, and this new ASR/1540 combination will offer a higher resolution per magnification capability than is presently available for viewing roll film in stereo.

3. When the 1540 light table was tested with the [ ] Stereoscope at its highest magnifications, significant vibrations were seen as a result of transmitted vibrations from the building; however, the use of the Versatile Stereoscope is not a complete simulation of the situation that will occur with the ASR/1540 combination because the following factors improve the vibration situation in the ASR/1540:

- a. The ASR weighs less than the Versatile Stereoscope.
- b. Because the resolving power is greater using the ASR, the ASR will be used at a lower magnification power than the [ ] Stereo-viewer.

The factors listed above that improve the ASR over the [ ] Stereoscope will probably not eliminate the vibrations seen in the high magnification [ ] Stereoscope tests, because it is anticipated that at the highest magnifications of the ASR at some places within NPIC some vibrations will be seen. The following actions are recommended to aid in circumventing the expected vibration problem at the high magnification levels:

- a. The building vibration survey that has been underway within the Center should be continued on an intensified scale and expanded. TSSG will effect the necessary remedies to minimize the vibration if feasible. (Indications are that dirty air condition ducts could be a serious cause.) Preliminary indications show that there are wide vibrations throughout the building, which are also probably time dependent. For example, next to one of the building support posts the vibrations appear to be only random, but at the mid-point of four support posts the vibration appears to be constant and much larger in magnitude.

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b. Initiate a study within TSSG to study the effect of incorporating vibration isolating mounts on the light tables and investigate the feasibility of insulating the light tables from the building through other specialized vibration isolation methods.

c. Relocate the instruments to areas less susceptible to floor vibration. (Information in a. is required for judicious placement of instruments.)

d. Investigate the feasibility of employing specialized film handling methods, which lock the film in a fixed relationship to the objective lenses of the viewing instrument so that as the instrument vibrates the film vibrates also. However, this latter solution is fraught with implementation problems that may prove impractical. It should be mentioned that discussions are underway within TSSG to implement a plan to address these actions.

5. It has been shown that there are no internal vibrations within the ASR and that all practical design considerations have been considered in eliminating these vibrations. The ASR prototype is required to complete testing of the operational suitability, including a vibrational analysis at all magnifications of the ASR/1540 configuration. Therefore, it is recommended that this prototype development proceed without further delay.

Chief, Research & Engineering Division,  
TSSG

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